ticle ink is deposited and heated as described above. Consequently, the emitter metal electrode **502** may then be added to the exposed n+ particle channel.

[0186] Furthermore, as previously described, diffused BSF **510** may also be added on the wafer back-side in order to repel minority charge carriers and thus improve overall efficiency. In contact with diffused BSF **510** is generally base contact **512** (typically comprising a lower cost Al paste) in order to extract the majority charge carriers (here holes). In addition, base contact **512** also serves as a mirror to reflect long wavelength light back into the cell for additional passes through the absorber.

C. Point Junction Solar Cell

[0187] Referring now to FIGS. **7**A-B, a set of simplified diagrams of point junction solar cells is shown. FIG. **7**A shows a simplified diagram of a conventional diffused point junction solar cell. FIG. **7**B shows a particle point junction solar cell, in accordance with the present invention.

[0188] Referring now to FIG. **7**A, a simplified diagram of a conventional diffused point junction solar cell is shown. In general, an alternate approach to achieving high efficiency in solar cells is to reduce the area of the collection junction from a relatively large area diffused homogenous emitter to a to a series of diffused point emitters **706** (alternatively, other reduced configurations may also be used, such as lines, etc.). Consequently, the treatment of the remaining surfaces can be optimized to reduce the recombination, thus improving efficiency. See R. R. King, R. A. Sinton, R. M. Swanson, *Studies of diffused phosphorus emitters: saturation current, surface recombination velocity and quantum efficiency,* 37 no. 2, IEEE Trans. Elec. Dev. (1990). In addition, the interfaces to base metal electrode **512** may also be reduced by the addition of dielectric layer **710** with a series of reduced area diffused contacts **714**.

[0189] While the performance of these devices is generally high, the manufacturing of reduced area collection junctions is generally difficult due to the use of costly traditional semiconductor processing techniques, such as photolithography, in order to define the different regions.

[0190] Referring now to FIG. **7**B, a particle point junction solar cell is shown, in accordance with the present invention. While not wishing to be bound by theory, it is believed by the inventors that replacing the set of reduced area diffused emitters in FIG. **7**A (diffused point emitter **706**) with a set of reduced area fused particle emitters (particle point emitter **726**), and also optionally replacing the set of reduced area diffused contacts (diffused contract **714**) with a set of reduced area fused particle contacts (particle contact **724**), an efficient solar cell may be created at about the same or lower cost as a conventional reduced area emitter solar cell.

D. All Back-Side Electrode Point Contact Solar Cell

[0191] Referring now to FIGS. **8**A-B, a set of simplified diagrams of an all back-side electrode point contact solar cells is shown. FIG. **8**A shows a simplified diagram of a conventional diffused point contact solar cell. FIG. **8**B shows a simplified diagram of a back-side electrode particle point contact solar cell, in accordance with the present invention.

[0192] Referring now to FIG. **8**A, a simplified diagram is shown of a conventional diffused point contact solar cell. In general, one solution to increasing the efficiency of conventional solar cells has been to place all the contacts on the back-side in an interdigitated manner. That is, interweaving alternating n-type regions and p-type regions. Increased currents are achieved by eliminating the shading losses usually incurred from the metal on the front side. Additionally, these solar cell structures are easier to interconnect into modules.

[0193] However, all back-contact structures are generally harder to fabricate since they require several aligned masking steps to define the rear diffused regions and electrodes. The inventors believe that the use of silicon nanoparticle ink greatly reduces the complexity of manufacturing such structures.

[0194] Referring now to FIG. **8**B, a simplified diagram of a back-side electrode particle point contact solar cell is shown, in accordance with the present invention. Unlike the diffused point contact solar cell of FIG. **8**A, the doped regions of the cell structure described herein may be created with fewer processing steps. In one method of deposition, prior to the deposition of dielectric layer **810**, lines of n+ particles and p+ particles may be deposited using an appropriate deposition technique, such as an inkjet printer. Dielectric layer **810** may then be deposited using appropriate means, such as PECVD. Emitter metal electrode **812** and base metal electrode **802** may then be applied via a silk-screening process, inkjet printing (e.g., by using solutions of metal micro- or nano-particles), or by Physical Vapor Deposition (e.g., thermal evaporation, e-beam deposition, sputtering, etc.) as previously described. In general, an Ag paste with glass frit is applied and then heated in order to punch through the dielectric **810** and to make contact with fused particle BSF **820** and particle point emitter **826**.

[0195] Alternatively, dielectric layer **810** may be deposited first. A laser or other alternative technique may then be used to define channels into which particles may be deposited and heated as described above. Consequently, the metal may then be added to the exposed particle channels.

[0196] For the purposes of this disclosure and unless otherwise specified, "a" or "an" means "one or more." All patents, applications, references and publications cited herein are incorporated by reference in their entirety to the same extent as if they were individually incorporated by reference.

[0197] The invention has been described with reference to various specific and illustrative embodiments. However, it should be understood that many variations and modifications may be made while remaining within the spirit and scope of the invention. Advantages of the invention include the production of low cost and efficient junctions for electrical devices, such as solar cells.

[0198] Having disclosed exemplary embodiments and the best mode, modifications and variations may be made to the disclosed embodiments while remaining within the subject and spirit of the invention as defined by the following claims.

1.-**43**. (canceled)

44. A method for producing a device for generating electricity from solar radiation comprising:

a) preparing a wafer doped with a first dopant, the wafer including a front-side and a back-side, wherein the front-side is configured to be exposed to the solar radiation;

b) forming a front-side diffused region on the front-side, wherein the front-side diffused region is doped with a second dopant and wherein the second dopant is a counter dopant to the first dopant;

c) forming a back-side diffused region on the back-side by applying and sintering a colloidal dispersion including a set of Group IV nanoparticles;